

Presentation of the Centre Borelli

The Centre Borelli is a joint research unit that brings together researchers in mathematics, computer science and neuroscience who are very involved in interfaces with the biomedical field and industrial transfer.



Centre Borelli, UMR 9010

A joint unit research

The Centre Borelli is a joint unit research (UMR 9010) bringing together researchers in mathematics, computer science and neuroscience who are very involved in interfaces with the biomedical field and industrial transfer.

It is located on several sites among the [ENS Paris-Saclay \(https://ens-paris-saclay.fr\)](https://ens-paris-saclay.fr), the [Université Paris Cité \(https://u-paris.fr/\)](https://u-paris.fr/) (Campus Saint-Germain-des-Prés), the Army training hospital [HIA Bégin \(https://www.defense.gouv.fr/sante/sante-publique/hopitaux-militaires/begin-saint-mande-94\)](https://www.defense.gouv.fr/sante/sante-publique/hopitaux-militaires/begin-saint-mande-94) and ['HIA Percy \(https://www.hiapercy.sante.defense.gouv.fr/services/neurologie/\)](https://www.hiapercy.sante.defense.gouv.fr/services/neurologie/).

A scientific approach

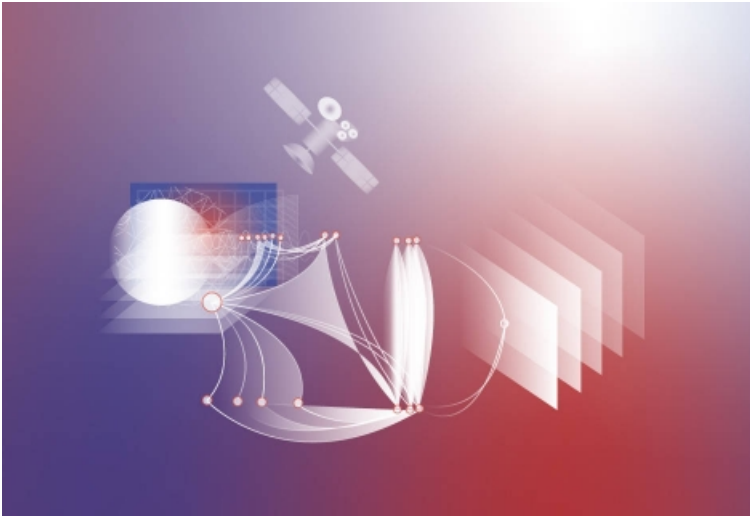
The specificity of the Centre Borelli is to develop fundamental knowledge in neuroscience and mathematics, scientific methods in modeling, simulation and processing of complex data, clinical approaches and software tools. The research effort is characterized by an interdisciplinary and global approach including a theoretical base, an intimacy with the reality of the studied phenomena (observations in situ, transdisciplinarity expertise), a realization of the achievements through digital technologies (industrial digital codes, Internet platforms, mobile applications) and an approach respecting the canons of reproducible science

Motivations

Research actions are motivated by real data and use cases from

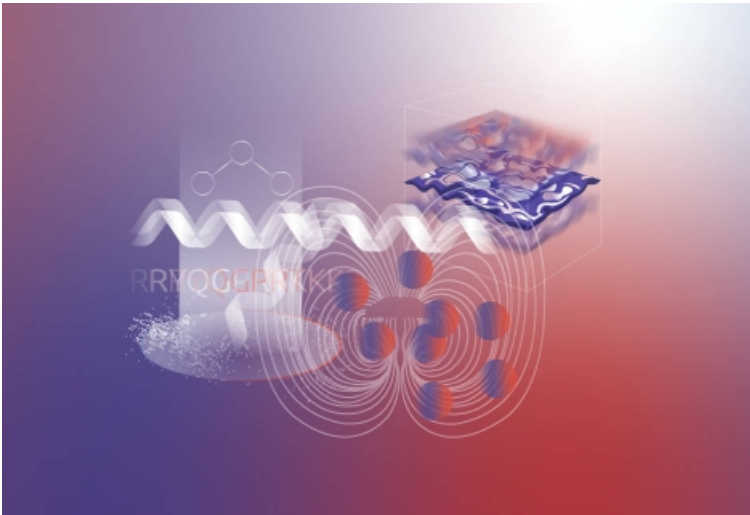
- › Health
- › Medecine
- › Physical science
- › Social science
- › Life science
- › Industry

Main axis of research



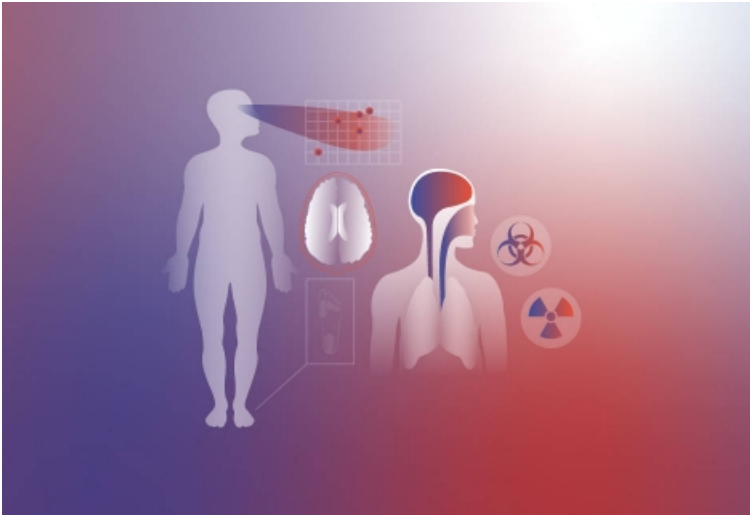
Mathematical foundations and algorithms for artificial perception and learning

This theme covers image, video and signal processing and analysis, machine learning and network science.



Modeling, mathematical analysis and simulation of complex physical, natural and biological phenomena

Mathematicians, numerical analysts, statisticians, biologists, mechanics and physicists find themselves in this axis to develop and analyze numerical models of complex systems.



Integrative and behavioral neurosciences in humans and animals

This axis brings together neurophysiologists, clinicians, ergonomists, psychiatrists and statisticians to formalize the quantitative study of human behavior in normal, altered or pathological...

Some achievements

Satellite Stereo Pipeline

S2P is a processing chain developed at the Centre Borelli, in collaboration with CNES, which allows the estimation of 3D information from pairs of stereo images taken by satellite.

Software Python/Ruptures

Python/Ruptures is a Python library for off-line change point detection that provides methods for the analysis and segmentation of non-stationary signals.

IPOL Journal

IPOL is an Open Science and Reproducible Research journal in signal and image processing.

Governance management

Management committee:

Nicolas VAYATIS (Director), Damien RICARD (Deputy director), Christophe LABOURDETTE (Technical Director), Véronique ALMADOVAR (Administrator)

Laboratory council:

- › Thomas ALAZARD ; Gabriele FACCIOLO ; Marylène JOUSSE ; Eric KREJCI ; Jean-Luc MARTINOT ; Laurent OUDRE ; Catherine VIDAL
- › Miguel COLOM BARCO ; Lise HADDOUK ; Julien NELSON ; Laure QUIVY ; Rémi TESSON.
- › Christophe LABOURDETTE ; Jacqueline LEROY.
- › Véronique ALMADOVAR ; Manuelle NORDEY.
- › Mateo CAMPOS ; Marie GARIN ; Anthéa MERIDA MONTES DE OCA ; Tina NIKOUKHAH.

Organization chart of the Centre Borelli



History

The Centre Borelli is the result of the merger of two CNRS Units

- > **CMLA (Centre de Mathématiques et de Leurs Applications)** created at the ENS de Cachan
(https://fr.wikipedia.org/wiki/%C3%89cole_normale_sup%C3%A9rieure_Paris-Saclay#1985:_L'%C3%89cole_normale_sup%C3%A9rieure_de_Cachan) in the early 1990s
- > **Cognac G (Cognition and Action Group)** initiated in 2014 at the Université Paris-Descartes
(https://fr.wikipedia.org/wiki/Universit%C3%A9_Paris-Descartes).